NON-PUBLIC?: N
ACCESSION #: 8808180224
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Zion, Unit 1 PAGE: 1 of 3

DOCKET NUMBER: 05000295

TITLE: Reactor Trip Due to Feed Flow Square Root Module Failure
EVENT DATE: 07/13/88 LER #: 88-013-00 REPORT DATE: 08/13/88

OTHER FACILITIES INVOLVED:
FACILITY NAME: Unit 1 DOCKET #: 05000295

OPERATING MODE: 1 POWER LEVEL: 99

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Michael Lesnet TELEPHONE #: 312-746-2084 Ext. 321

COMPONENT FAILURE DESCRIPTION:
CAUSE: B SYSTEM: JB COMPONENT: IMOD MANUFACTURER: H021
REPORTABLE TO NPRDS: Y

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT: On July 13, 1988 Unit 1 was operating at 99% power when a reactor trip occurred on steam flow/feedwater flow mismatch with low (25%) steam generator level. Investigation into the event revealed that feedwater square root extractor 1FM-530B, which supplies a signal to steam generator D level control when the feedwater flow channel selector switch is selected to the 1F-530 position, had failed high. This caused the steam generator loop D feedwater regulating valve to shut. A reactor trip occurred on steam flow/feedwater flow mismatch with low steam generator level. The cause of the event was failure of square root extractor 1FM-530B. The cause of the module failure was a bad amplifier. The module was replaced with a spare module.

(End of Abstract)

TEXT: PAGE: 2 of 3

A. PLANT CONDITIONS PRIOR TO EVENT:

MODE 1 - Power Operations RX Power 99%
RCS (AB) Temperature/Pressure 559.5 degrees F/2235 psig

B. DESCRIPTION OF EVENT:

On July 13, 1988, unit 1 was operating at 99% power (Mode 1) when a reactor trip occurred on steam generator loop D steam flow/feedwater flow mismatch with low steam generator level (25% level). All systems responded

as designed after the trip. The Nuclear Station Operator (NSO) observed after the trip that steam generator D feed flow indicator 1FI-530A was reading offscale. A work request was written to investigate the problem.

C. CAUSE OF EVENT:

The investigation of the event revealed that steam generator loop D feedwater flow square root extractor 1FM-530B had failed high. The square root extractor supplies a signal to feedwater flow indicator 1FI-530A and also supplies the steam generator D level control when the feedwater flow channel selector switch is selected to the 1F-530 position. The high signal from the square root extractor caused the steam generator D feedwater regulating valve to close. This caused the steam flow/feedwater flow mismatch with low steam generator level reactor trip. The NSO shifted steam generator level control to manual to open the feedwater regulating valve but he could not raise steam generator level above 25% fast enough to prevent the trip.

The cause of the event was square root extractor 1FM-530B which failed high. The cause of the square root extractor failure was a failed amplifier. Another amplifier in the module was also found out of alignment.

D. ANALYSIS OF THE EVENT:

The feedwater regulating valve shut as designed on a high feedwater flow signal from the failed module. The steam flow/feedwater flow mismatch with low steam generator level reactor trip occurred because the feedwater regulating valve shut. All plant protective systems performed as designed during the event. The health and safety of the public was not affected.

E. CORRECTIVE ACTIONS:

The failed square root extractor was replaced and the feedwater flow loop was returned to normal after the new module was calibrated. The bad amplifier in the failed module was later replaced. These square root extractor modules are checked during quarterly functional tests which have found 7 of the last

9 extractor module problems in the last two years.

F. PREVIOUS OCCURRENCES:

In the past 5 years there have been no other reactor trips due to failed square root extractor or multiplier/divider modules. The multiplier/divider module is the same as the square root extractor module. In the past 2 years there have been 9 Instrument Discrepancy Reports on these multiplier/divider/square root extractor modules out of a total of 40 modules in both units. Seven of these were found during quarterly functional tests. Modules were replaced in 8 of these reports but normally it is easier to replace the module in the loop rather than take the time to repair it with the unit operating because the loop is out of service for a shorter period of time. Four of the replacements were for noisy modules. The capacitors were replaced in these modules. Two of the modules needed alignment between the internal segments of the module. There were no other amplifier failures. Based on the above, at the present time amplifier failures are considered to be a rare occurrence and capacitor failures are detectable during quarterly functional testing. Thus, no increased surveillance or additional corrective action is required.

G. COMPONENT FAILURE DATA:

MANUFACTURER NOMENCLATURE MODEL NUMBER MFG. PART NUMBER

Hagan Multiplier/Divider 127-112 4111511

ATTACHMENT # 1 TO ANO # 8808180224 PAGE: 1 of 1

Commonwealth Edison
Zion Generating Station
101 Shiloh Blvd
Zion, Illinois 60099
Telephone 312/746-2084

August 11, 1988

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Dear Sir:

The enclosed Licensee Event Report number 88-013-00, Docket No. 50-295/DPR-39 from Zion Generating Station is being transmitted to you in accordance with the requirements

of 10CFR50.73 (a) (2) (iv), which requires a 30 day written report when any event or condition results in manual or automatic actuation of any Engineered Safeguards Feature (ESF).

Very truly yours,

/s/ ILLEGIBLE
for G.J. Pliml
Station Manager
Zion Generating Station

GJP/ts

Enclosure: Licensee Event Report

cc: NRC Region III Administrator
NRC Resident Inspector
INPO Record Center
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